




**Revision of Bhante Punnaaji's Lessons**  
*From A Scientific Perspective With Bro. Billy Tan*



- The Five Constituents of the Process of Perception (**Pañca-khandha**)
- Personalizing the Body (**Sakkāya-dīṭṭhi**)


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## Synopsis

- ⌘ *Saññā* (sensation) & *Vedanā* (feeling);
- ⌘ *Saṅkhāra* (mental construction);
- ⌘ *Viññāna* (perception);
- ⌘ Five Constituents of the Process of Perception (*Pañca-khandha*);
- ⌘ Personalizing the subjective experience (*upādāna*) lead to the notion of a self-centered existence.

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## WHO AM I ?




❖ I am an Organism in an Environment

**1. METABOLISM :**  
Life sustaining process;

**2. CONSCIOUSNESS :**  
Experiencing the Environment through 5 physiological senses;

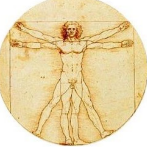
- SIGHT
- HEARING
- SMELL
- TASTE
- TOUCH




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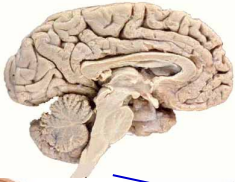
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## CENTRAL NERVOUS SYSTEM

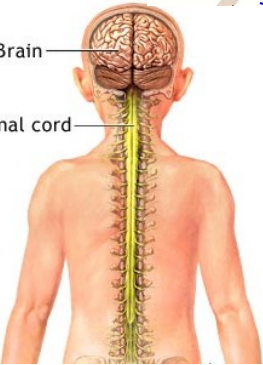


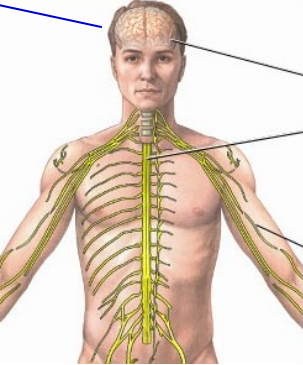




Brain

Spinal cord





Central nervous system

Brain

Spinal cord

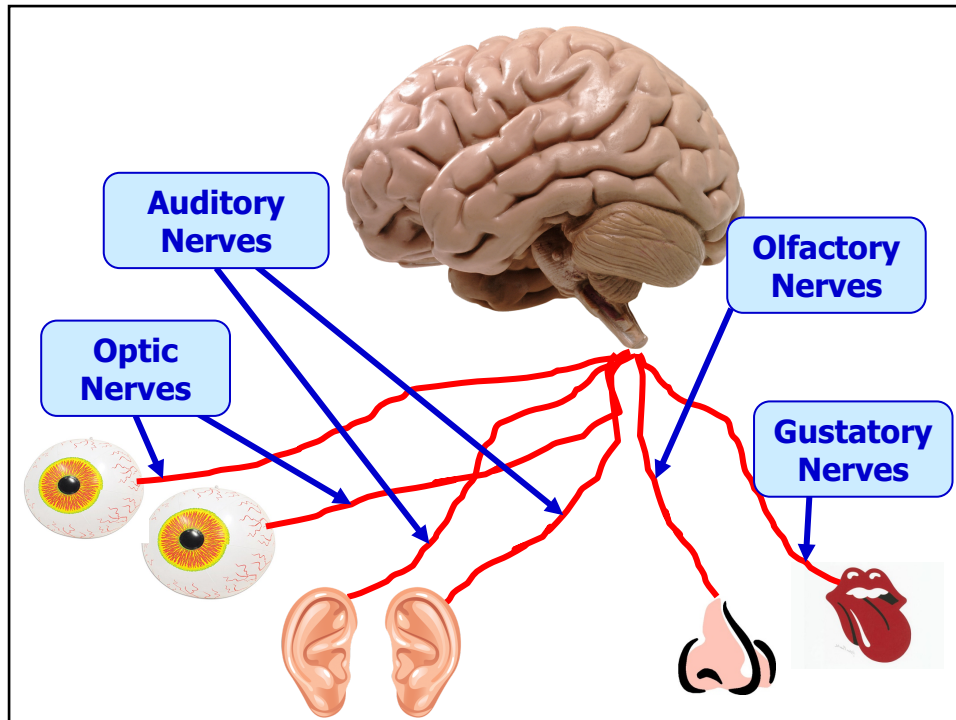
Peripheral nervous system

Peripheral nerve

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### OUR EVOLVING BRAIN

Our brain evolved over millions of years into **3 main layers**:

**HUMAN BRAIN**

- Cerebral Cortex** ("Learning Brain")
- Limbic System** ("Emotional Brain")
- Brain Stem** ("Survival Brain")

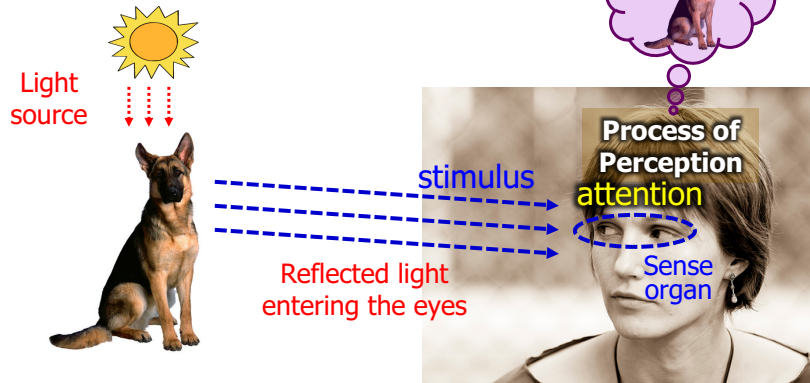
Spinal Cord

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## The Experience of "Seeing"

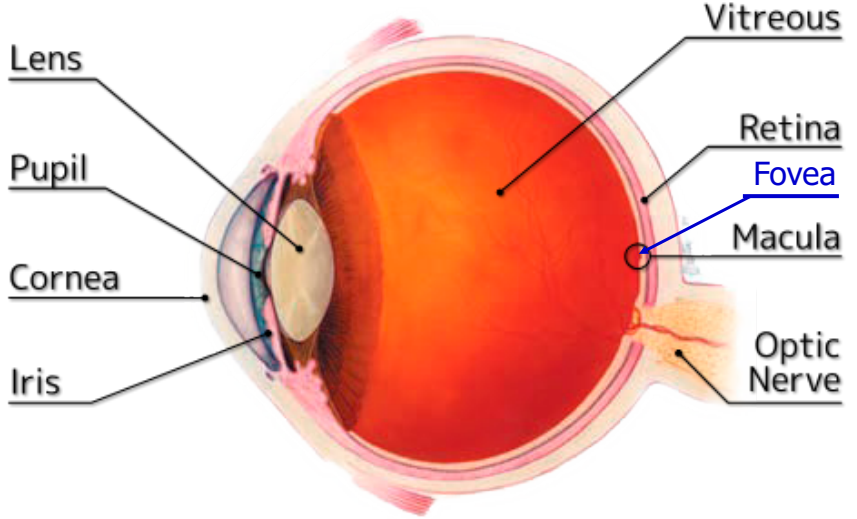
- Experience arises dependent on the presence of necessary conditions:



The diagram illustrates the process of seeing. On the left, a sun icon labeled "Light source" emits red dashed arrows representing light. These arrows hit a dog, and red dashed arrows labeled "Reflected light entering the eyes" point towards a woman's eyes. Blue dashed arrows labeled "stimulus" also point from the dog towards the woman's eyes. The woman's eyes are circled in blue and labeled "Sense organ". Above her eyes, the text "Process of Perception" and "attention" is written. A thought bubble above her head shows a dog, labeled "Mental Image".

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## The Eyeball



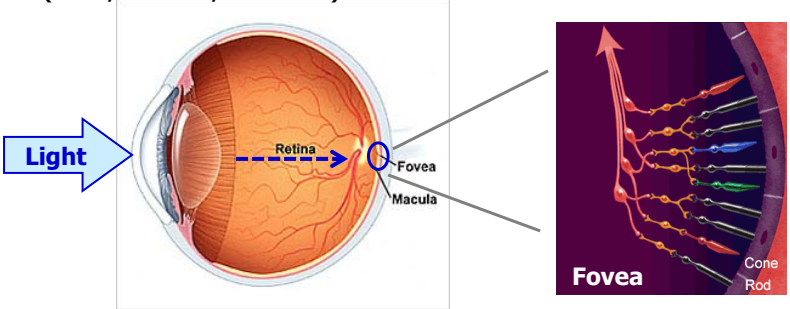
The diagram shows a cross-section of the human eyeball with the following parts labeled:

- Cornea**: The outermost, curved front part of the eye.
- Iris**: The colored part of the eye.
- Pupil**: The opening in the center of the iris.
- Lens**: A biconvex structure behind the pupil.
- Vitreous**: The clear, gel-like substance filling the interior of the eye.
- Retina**: The light-sensitive inner lining at the back of the eye.
- Macula**: A small, specialized area on the retina for central vision.
- Fovea**: A small pit in the center of the macula.
- Optic Nerve**: The nerve that carries visual information from the retina to the brain.

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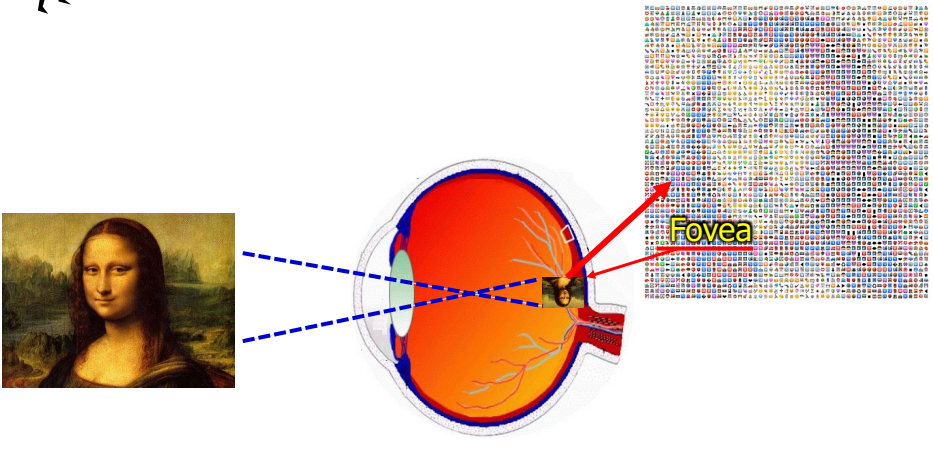
## Light Sensitive Cells

- ❖ Approx 150 million Rod and Cone cells in Macula (d5.5mm);
- ❖ Rod cells sense shades of gray, blurry images;
- ❖ **3 types of Cone cells** concentrated in Fovea (d1.5mm);
- ❖ Cone cells sense specific range of colours in sharp focus;
- ❖ Each Cone cell sensitive only to one range of wavelength (Red, Green, or Blue).

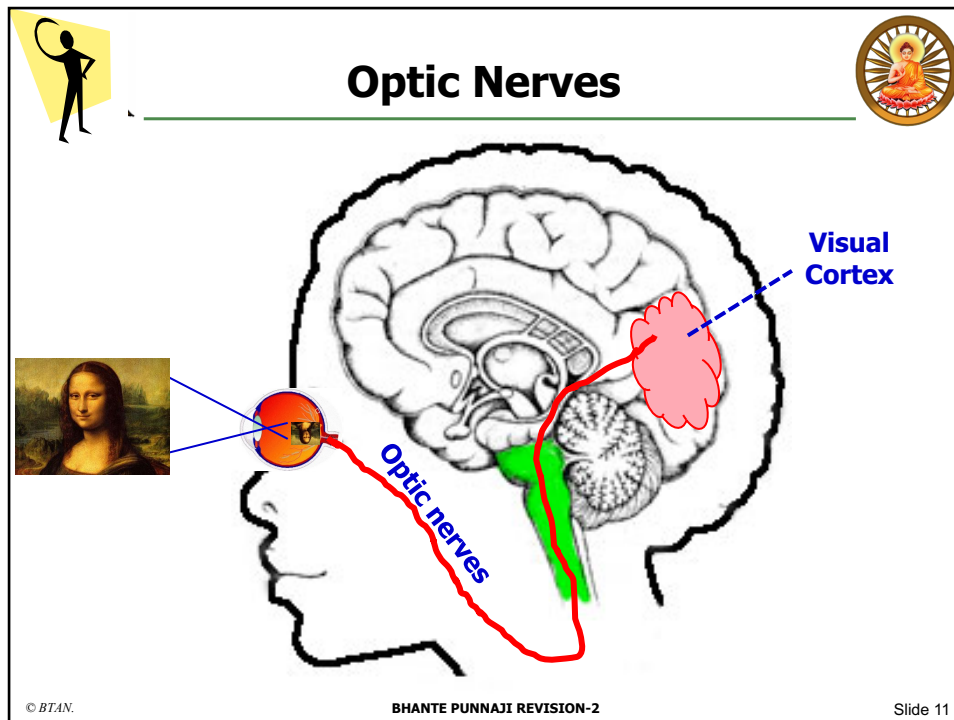


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## The Retina



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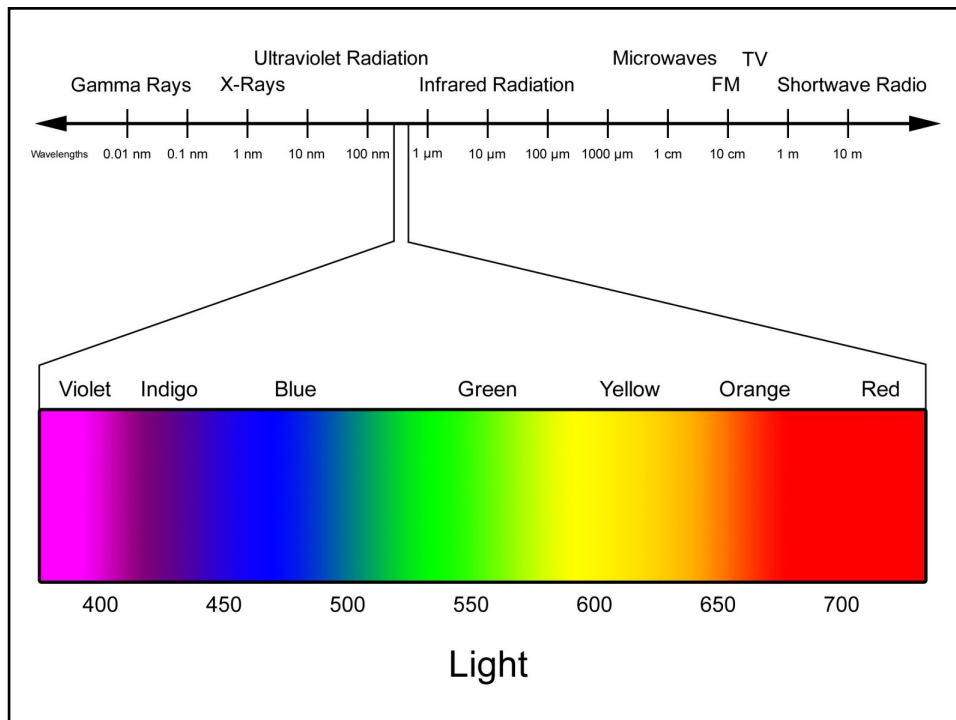
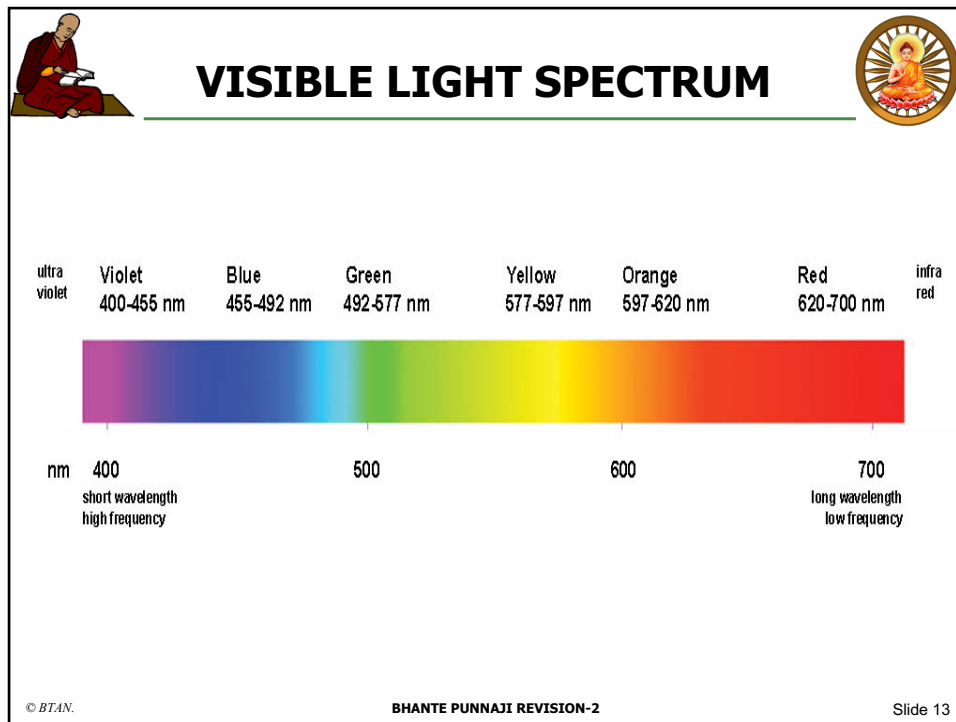



The diagram illustrates the visual pathway. Light from an object (represented by the Mona Lisa) enters the eye and is focused on the retina. The optic nerves, shown in red, carry the visual information from the eye to the optic chiasm, then to the optic tract, and finally to the optic tectum. From there, the visual pathway continues to the lateral geniculate nucleus and the optic chiasm, eventually reaching the visual cortex, which is highlighted in pink. Labels include 'Optic Nerves' and 'Visual Cortex'. The diagram is titled 'Optic Nerves' and includes a small icon of a person in the top left and a circular logo with a Buddha figure in the top right.

## Sensation of Colours

- The simple act of seeing a colour triggers a **spontaneous reaction** in the central nervous system - this is automatic;
- It isn't caused by any association, but by the wavelength of the colour;
- Objects reflect light at different wavelengths, and our brain interprets these wavelengths as different colours;
- Blue (the shortest wavelength) through green and yellow, to red (the longest wavelength);
- The long wavelengths (red & orange) are said to **arouse the nervous system** - heartrate and blood pressure increase.
- The short wavelengths (blue & violet) are meant to **relax the nervous system**.


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## Sensa

"SENSATION" - Saññā



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- The simple act of seeing a colour triggers a **spontaneous reaction** in the central nervous system - this is automatic;
- It isn't caused by any association, but by the wavelength of the colour.

Unpleasant "feelings" - Vedanā

nt wavelengths, and our brain interprets these wavelengths as different colours;


Pleasant "feelings" - Vedanā

- Blue (the shortest wavelength) to red (the longest wavelength),
- The long wavelengths (**red & orange colours**) are said to **arouse (aggitate) the nervous system** - heartrate and blood pressure increase.
- The short wavelengths (**blue, green & violet colours**) are meant to **relax the nervous system**.


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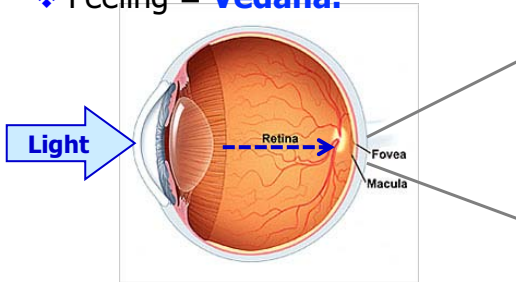
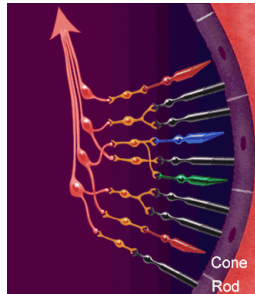


## LIGHT SENSATION



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- ❖ Rod cell senses light of any wavelength in visible spectrum;
- ❖ Cone cell senses light of wavelength of its type (R, G, B);
- ❖ Light stimulation of Rod or Cone cell causes a sensation;
- ❖ Every stimulated cell sends the sensation to the brain;
- ❖ Sensation = **Saññā**;
- ❖ Feeling = **Vedanā**.

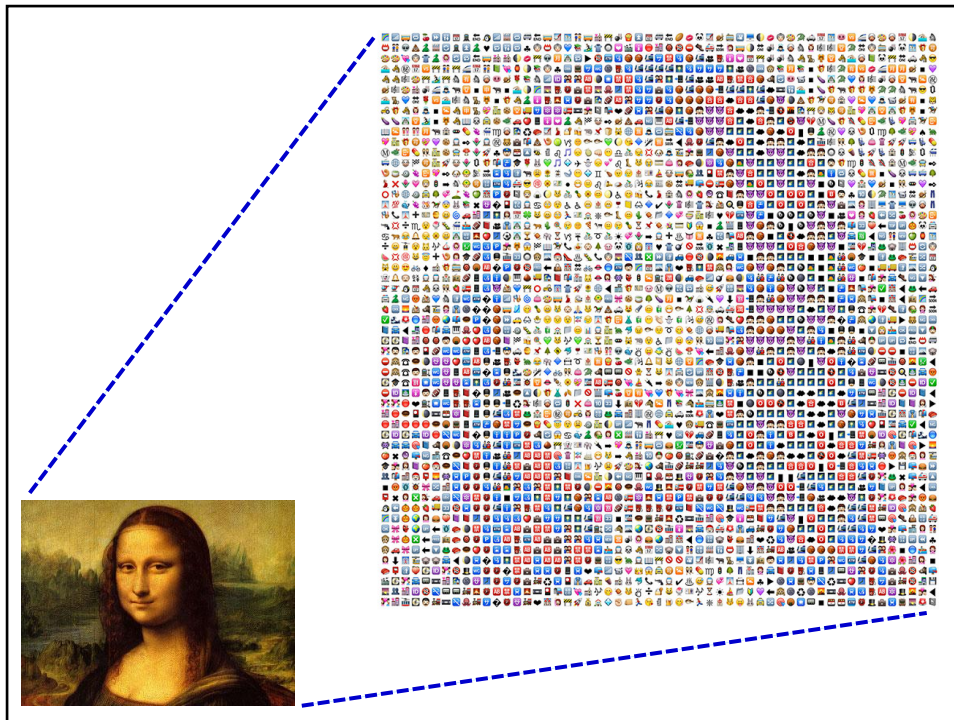



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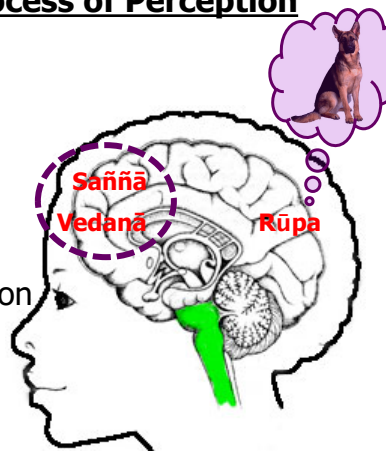
## THE PROCESS OF PERCEPTION





**PAÑCA-KHANDHA** (traditionally "the 5 aggregates")

### The 5 Constituents of the Process of Perception

1. Rūpa – Seeing an Image
- Vedanā – Feeling
- Saññā – Sensation
4. Saṅkhāra – Mental Construction
5. Viññāna – Perception







## SENSE STIMULATION

Environmental activities stimulate the sense organs:

- SIGHT: Reflected light stimulates cone and rod cells in the retina;
- HEARING: Air vibration stimulates the ear-drum;
- TOUCH: Pressure, temperature, vibration, chemicals stimulate tactile sensory receptors under the skin;
- SMELL: Odorant molecules bind to receptor cells in the olfactory bulb;
- TASTE: Flavour molecules react chemically with gustatory sense receptors in the taste buds;

❑ **Stimulations trigger sensation ("saññā") and arouse feeling ("vedanā") in nervous system.**

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## SENSATION ("saññā")

❖ Stimulation of sense organ triggers nerve impulses or **sensation** ("saññā") in the nervous system carried to the brain:

- SIGHT: sensation refers to the sensing of wavelength ("colour") and intensity ("brightness") of the light stimuli;
- HEARING: sensation refers to the sensing of air vibration frequency ("pitch") and amplitude ("loudness");
- ...etc



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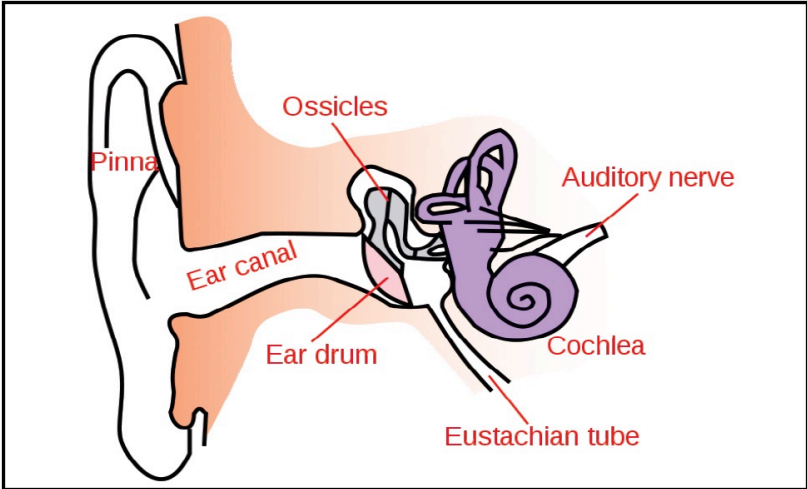
 **FEELING ("vedanā")** 

❖ Sensation ("saññā") invariably arouses a **feeling** ("vedanā") in the nervous system (inseparable):


- **SIGHT:** feeling refers to how the nervous system is irritated by long wavelengths (**red, orange, yellow**) and high intensity (**bright**) light, and soothed by short wavelengths (**blue, green**) and low intensity (**dim**) light;
- **HEARING:** feeling refers how the nervous system is irritated by high frequency (**pitch**) and **large amplitude** (loud) sound waves, and soothed by low frequency and soft mellow sound waves.

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 **Ear Canal** 



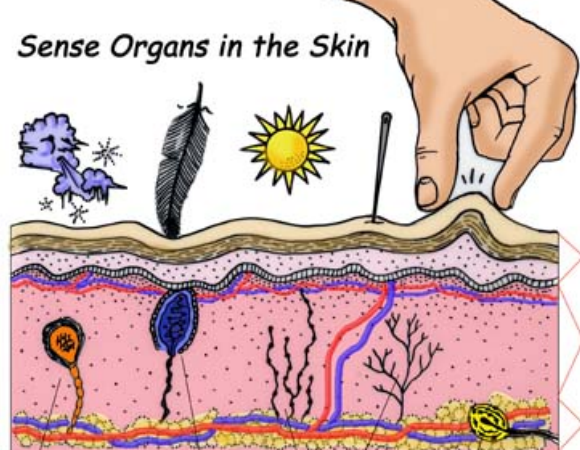
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## Touch Receptors under the Skin



*Sense Organs in the Skin*



*thermo-receptor*  
Sensing Temperature

*Meissner's corpuscle*  
Sensing Vibration


*nociceptor*  
Sensing Pain

*pacinian corpuscle*  
Sensing Pressure


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## THE PROCESS OF PERCEPTION

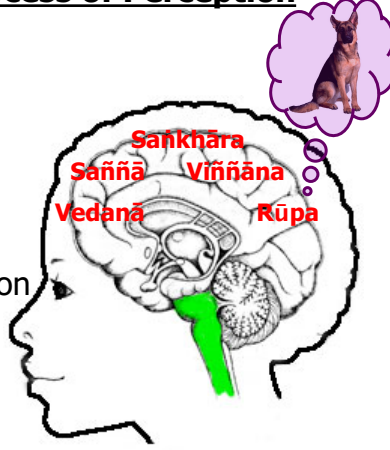


**PAÑCA-KHANDHA** (traditionally "the 5 aggregates")

**The 5 Constituents of the Process of Perception**

1. **Rūpa** – Seeing an Image

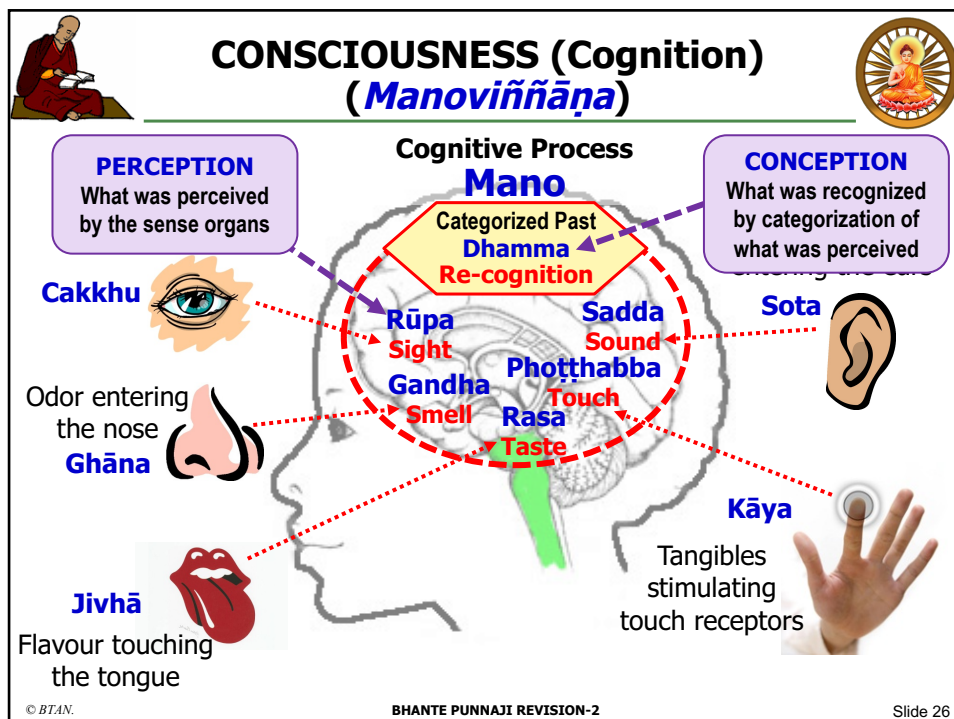
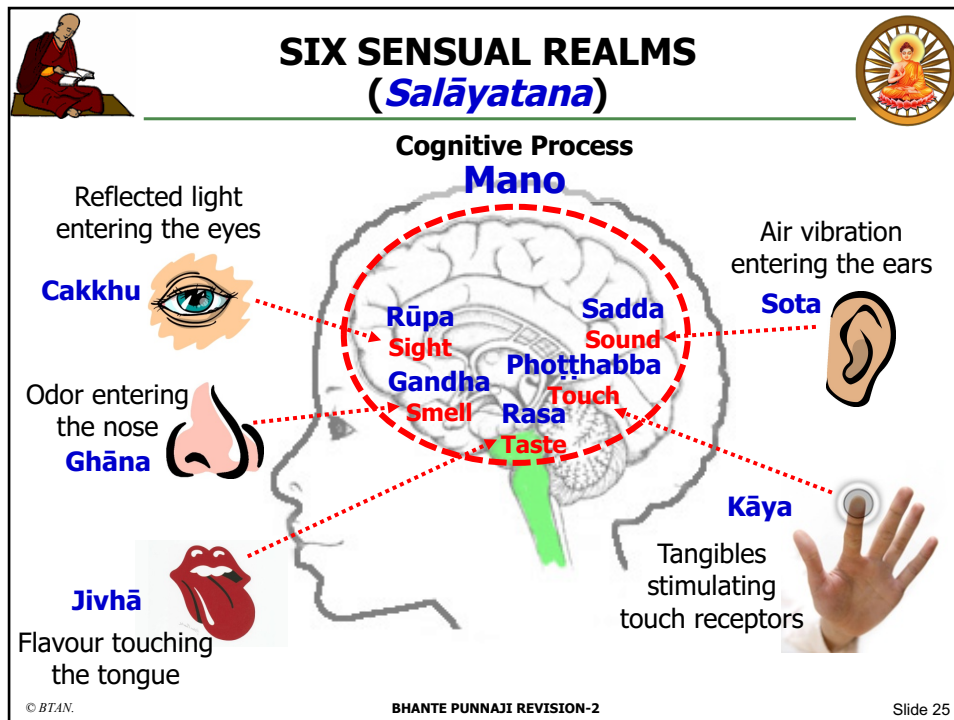
- Vedanā** – Feeling
- Saññā** – Sensation
- Saṅkhāra** – Mental Construction
- Viññāna** – Perception




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## MIND AS AN ACTIVITY




### THREE PARTS OF MENTAL EXPERIENCES:

- **Viññāna** : **Process of Perception** ("perception")
  - what was perceive through the sense organs;
- **Mano** : **Cognitive Process** ("cognition & conception")
  - categorized interpretation of perception giving meaning ("nāma") to what was perceived ("rūpa");
- **Citta** : **Affective Process** ("mood / temperament")
  - emotional reaction ("tanhā") from emotional excitement to pleasant & unpleasant feelings ("vedanā") leads to mood or temperament (emotional state of mind);
  - personalizing the experience leading to the notion of a self-centered existence.

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## PROCESS OF EXPERIENCE



❖ Experience is a Chain-Reaction:

**PAÑCA-KHANDHA**

- Vedanā – Feeling
- Saññā – Sensation
- Saṅkhāra – Mental Construction
- Viññāna – Perception
- Rūpa –Mental Image

"Pañca-khandha"

**PERCEPTION**  
("Viññāna")

↓

**COGNITIVE PROCESS**  
("Mano")

↓

❖ PLEASANT
❖ UNPLEASANT
❖ NEITHER


**Recognition**

Categorized Memory of Fluid Past

**Re-cognition**  
(dhamma)



**Concept**

**Concept of an entity identified as "DOG"**  
(Nāma)



Mental Image  
(Rūpa)

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## PROCESS OF EXPERIENCE

❖ Experience is a Chain-Reaction:

**PAÑCA-KHANDHA**

- Vedanā – Feeling
- Saññā – Sensation
- Saṅkhāra – Mental Construction
- Viññāna – Perception
- Rūpa – Mental Image

“Pañca-khandha”

PERCEPTION  
 (“Viññāna”)

↓

COGNITIVE PROCESS  
 (“Mano”)

↓

AFFECTIVE PROCESS  
 (“Citta”)



↓

❖ PLEASANT

❖ UNPLEASANT


❖ NEITHER

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## FROM PERFEPTION TO CONSEQUENCE

❖ Experience is a Chain-Reaction:



**STIMULUS**

“Pañca-khandha”

PERCEPTION  
 (“Viññāna”)

↓

COGNITIVE PROCESS  
 (“Mano”)

↓

AFFECTIVE PROCESS  
 (“Citta”)

↓

VOLITION  
 (“Cetanā”)

↓

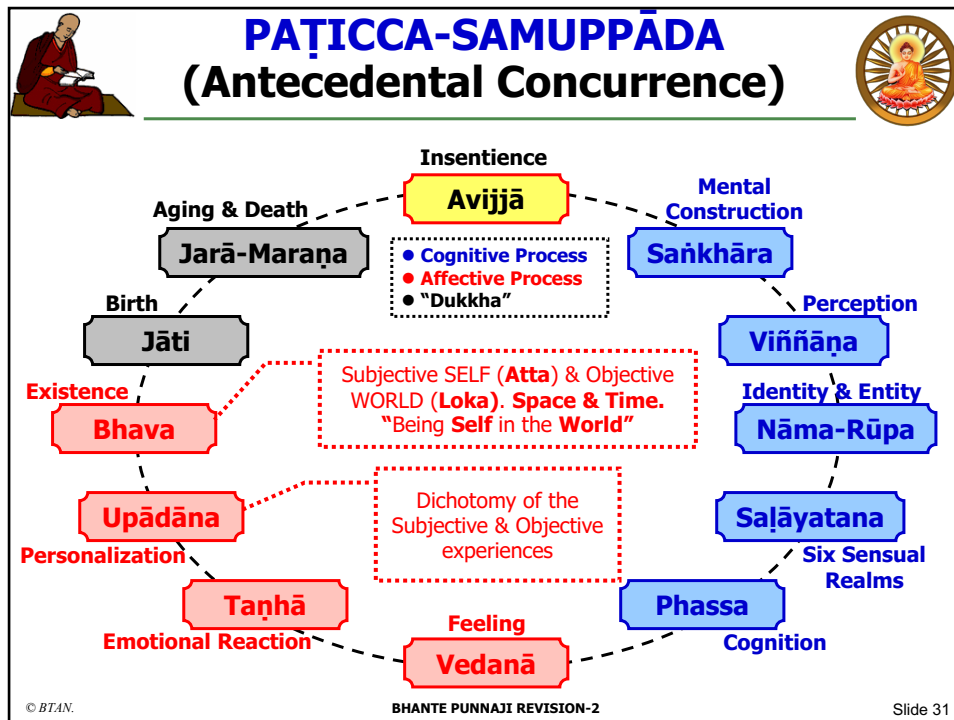
ACTION  
 (“Kamma”)

**RIPENING**

CONSEQUENCE  
 (“Vipāka”)

**FEEDBACK**

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## MIND AS AN ACTIVITY

### THREE PARTS OF MENTAL EXPERIENCES:

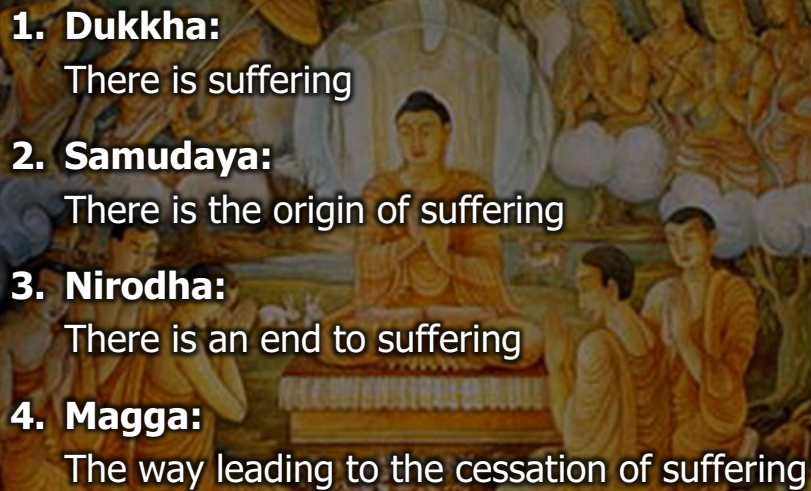
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  - what was perceived through the sense organs;
- **Mano** : **Cognitive Process** ("cognition & conception")
  - categorized interpretation of perception giving meaning ("nāma") to what was perceived ("rūpa");
- **Citta** : **Affective Process** ("mood / temperament")
 

- **emotional reaction** (*tanhā*) to pleasant & unpleasant **feelings** (*vedanā*) leads to **mood** or **temperament** (emotional state of mind);
  - personalizing the experience (*upādāna*) leading to the notion of a **self-centered** existence.

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## DHAMMACAKKAPPAVATTANA SUTTA Setting into Motion the Wheel of Dhamma

- 
- 1. Dukkha:**  
There is suffering
  - 2. Samudaya:**  
There is the origin of suffering
  - 3. Nirodha:**  
There is an end to suffering
  - 4. Magga:**  
The way leading to the cessation of suffering





### THE FIRST NOBLE TRUTH



#### THERE IS SUFFERING (**DUKKHA**)

- This is the noble truth of suffering: (1) **birth** is suffering, (2) **aging** is suffering, (3) **illness** is suffering, (4) **death** is suffering;
- (5) separation from what is **pleasing** is suffering;
- (6) union with what is **displeasing** is suffering;
- (7) not to get what one **wants** is suffering;
- in brief, (8) the **five aggregates subject to clinging** (*pañcupādānakkhandhā*) is suffering.



## THE SECOND NOBLE TRUTH

**ORIGIN (CAUSE) OF SUFFERING (SAMUDAYA)**

- It is this **craving** (**tanhā**) which leads to renewed existence, accompanied by delight and lust, seeking delight here and there;
- that is, **craving** for sensual pleasures,
- **craving** for non-existence,
- **craving** for continued existence.



**Tanhā = Emotional reactions** ("craving")

**Lobha** –  
lust and greed  
for pleasures

**Dosa** –  
aversion and  
hatred towards  
displeasures

**Moha** –  
delusion of  
self-centered  
existence

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## The 3 Unwholesome Roots (Akusala Mula)

Emotional reactions (**tanhā**) are of three types:


- Pleasant sensations:
  - **Lobha: Lust & greed for pleasures**  
( **kāma-tanhā** – craving for sensual pleasures )
- Unpleasant sensations:
  - **Dosa: Aversion & hatred towards displeasures**  
( **vibhava-tanhā** – craving for non-existence )
- Neutral sensations:
  - **Moha: Delusion of self-centered existence**  
( **bhava-tanhā** – craving for continued existence )

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Neuroscience explains...


## Sakkāya–diṭṭhi

How “self” perspective arises:  
Personalization of the body and its experience into the notion of a “self”.




F G O






## MAX PLANCK INSTITUTE FOR BRAIN RESEARCH




- The Brain is a highly distributed, dynamical system that lacks a singular convergence center;
- There is no co-ordinator;
- There is no observer;
- There is no seat of the "self".

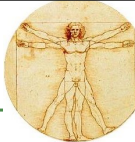


*Dr Wolf Singer, Director  
Max Planck Inst. For Brain Research*


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## WHEN SELF COMES TO MIND




1. Mind – continuous flow of mental images;
2. A conscious mind is a mind with a "self" in it;
3. The self introduces a subjective perspective in the mind;
4. We are only fully conscious when self comes to mind;
5. We need to know:
  - i. How minds are put together in the brain;
  - ii. How selves are constructed;
6. We generate brain maps of the body's interior, and uses them as a reference point for all other maps of the world;
7. The body and the experience of the body becomes the reference point for the self.




Antonio Damasio

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## Personalizing Bodily Sensations



- ❖ Sensation (*saññā*) of brushing on the hand;
- ❖ Feeling the pleasant sensation (*vedanā*) and seeing fake hand being brushed;
- ❖ Associating how we feel with what we see (multi-modality association);
- ❖ Personalizing (*upādāna*) the fake hand based on this association;
- ❖ “This (fake) hand is mine!” (self-centered)

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QUESTIONS ?

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